

SUPPLEMENT.

The Mining Journal, RAILWAY AND COMMERCIAL GAZETTE:

FORMING A COMPLETE RECORD OF THE PROCEEDINGS OF ALL PUBLIC COMPANIES.

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Original Correspondence.

EXPLOSIONS IN COLLIERIES, AND THEIR PREVENTION.

It is admitted that as yet but little progress has been made in the solution of that most important problem, how to prevent explosions in our coal mines. Indeed, it appears that as the working of our coal fields is extended the liability to accidents from accumulations of gas increases in the same proportion. With the view of preventing so powerful and subtle an opponent to the development of our most valuable minerals parliamentary committees have been filled with every description of evidence, scientific and theoretical; the leading mining engineers have exerted all their knowledge, various improvements with regard to ventilation have been suggested and adopted, whilst instruments of most sensitive nature have been invented for detecting the presence of gas, and warning the collier of danger. Still, with all that has been done, nothing that is really beneficial or practical has been devised, for we find that fatalities from accumulations and explosions of gas have of late years been more numerous than they were before.

Parliament, on the Report of a Committee of the House of Commons, some years since, thought that in appointing a dozen Inspectors of Mines, as they are termed, a most important advance had been made in giving increased safety to the collier. Experience, however, has shown that the results have in no way justified the expectations made, for the term "Inspector" is to all intents a misnomer, seeing that those gentlemen who fill the office cannot inspect a tithe of mines in their districts, so that no small part of their duties consist in inspecting mines after accidents have taken place, and in sending inquests.

The efforts of our mining engineers and scientific men having thus led to effect any material improvement by which accidents from explosions in mines have been rendered less frequent or fatal, the proposal made by Mr. Hermon, M.P., to give a series of prizes for best essays, to be competed for by working colliers in Lancashire and Yorkshire, on the prevention of explosions in collieries comes most apropos, and we have every reason to believe that the results of the competition will be in the highest degree satisfactory, to the credit of a body generally looked upon less favourably from the ordinary intellectual standard than any other class of working men. We are also rather sanguine that we shall find in some of the essays a practical and pertinent to the subject, and that, almost for the first time in our mining history, the working collier will be no important contributor to our knowledge as to the best means of preventing those fearful catastrophes in our coal mines with which we have of late been made so painfully familiar.

It is said by many of the leaders of the working collier that a man could not be allowed to work in any place where naked lights could not be safely used, on the ground that the atmosphere which renders safety-lamps an imperative necessity must be in the highest degree prejudicial to health, leaving out of view the question of danger together. This to some extent may be true, but if adopted under existing circumstances would lead to a complete stoppage of trade, which being the case, we must look for some other means of mitigating, if we cannot altogether prevent, an evil of such magnitude as that resulting from accumulations of gas in coal pits; and seeing that all previous methods suggested for such a purpose have proved futile, Mr. Hermon appears to have adopted the only mode left open by applying to those whose opinions have not hitherto been asked a subject which, to more than any other body, is of vital importance to them. Whatever the opinions of those who, as working colliers, may write on such an important subject, they will at least be received with respect, and adopted if found capable of practical application.

We reiterate that it is quite true that colliery explosions are now far more numerous and disastrous than they were some 30 or 40 years ago, or before safety-lamps were introduced. This was owing to the former mode of working, when the places where the coal had been got were swept by a strong current of air passing through them, every part of the mine being well ventilated. But to effect that object it was necessary to leave standing great pillars of coal to the extent of 50 per cent, or more, of the whole of the coal. The introduction of the safety-lamp, however, led to a great change, nearly the whole of the coal previously left as pillars being obtained. The consequence is that in getting all the coal the gas accumulates to a dangerous extent in the goaves, and too often leads to an explosion. The draining of those goaves of the gas, or ventilating them, has during the last two or three years received considerable attention at the hands of some of our most eminent mining engineers, and various measures have been suggested for the purpose by persons whose theories did not stand the test of practical application. Nothing of any consequence, we believe, has yet been done in the direction of clearing the goaves, and it is to be hoped that those who write the essays for the prizes of Mr. Hermon will not overlook so important a matter, seeing it is one they must be well acquainted with. That it is of very great importance is admitted by all persons engaged in mining operations, and no less an authority than Mr. Embleton, the President of the Midland Institute of Mining Engineers, speaking of it, said:—

"Could not some plan be adopted by means of which the goaves could be entirely, or in part, ventilated? Here is the source of the greatest danger. However well the system of ventilation be laid out, if gas is to be found in the un-ventilated parts the work is incomplete and imperfect. The material for an explosion is at hand, only awaiting some disturbance of the roof to discharge itself into the air-current, when meeting with an open light, or perhaps an imperfect lamp, it explodes, carrying destruction everywhere. How much better would it be to study how the gas can be removed, rather than be content to know that it exists, never thinking that it may at any time be the cause of loss both of life and property."

The views quoted above cannot fail to command the attention of those connected with mines, and it is to be hoped that they will lead to the adoption of some measure by which danger from gas in goaves will be removed. What are termed "outbursts of gas," either from the roof or floor, have long engaged the attention of those connected with mining work, and the question has been frequently discussed as to whether there are any sure means by which they can be prevented. It has been suggested, by one of the leading members of the South Yorkshire Miners' Association, that by boring along those parts of the floor of a pit where the gas might naturally be expected to ooz out, its gradual escape might be ensured. An eminent authority in

noticing the matter says that there is ample scope for enquiring into the causes of these eruptions of gas, "ascertaining the circumstances attending them, and deducing therefrom some mode of anticipating their effects, and it may be of obviating altogether their excessive discharge."

Blasting with gunpowder is another fertile source of destruction, and in Lancashire, Yorkshire, and Wales has led to very serious and fatal explosions. With regard to that means of bringing down the coal, there is every reason to believe that powder has not been used with that caution which its dangerous character requires, nor in the scientific manner which might easily be adopted. All our mining engineers are agreed that those engaged in superintending the blasting of coal should be well acquainted with the strength and tenacity of that mineral, as well as with the lines of resistance, so that no more power should be used than was actually necessary, and thus avoid reckless and dangerous waste. But were blasting done away with altogether, as it has been in many mines where gas is known to exist in large quantities, a great danger would be removed. We are thus led to notice the safety-lamp. With a "Geordie" lamp in his hand, many a collier considers himself fully armed against any and every danger. Experiments of late years have, however, shown that some of the best lamps have exhibited a facility and quickness in passing the flame through the gauze that, if the tests made are at all reliable, the lamps placed in the hands of colliers might turn out to be vehicles capable of "communicating flame to a surrounding fiery atmosphere."

It will thus be seen, from what we have stated, that with regard to our present knowledge as to the best means of averting colliery explosions there is a very extensive field open for investigation, and it is to be hoped that the liberality of Mr. Hermon will be the means of bringing to light some mode of working in coal mines that will lessen the liability of the miner to the most disastrous of all accidents to which he has hitherto been liable.

In the meantime much can be done to make the working places in collieries much safer than they now are. In that direction the views of Mr. Warburton, of the West Yorkshire Colliery, near Normanton, are worthy of serious consideration. He says that—

"Every collier examines his working place before he begins work, and receives his impression of the state of the place, which impression remains with him during the day, and he calls on unconsciously of the alteration that may be made by his operations. The only remedy appears to be by increasing the number of officers in the workings, so that each working place may be visited several times during the working hours, and thus be able to get a fresh impression of the actual condition on each visit, and to act accordingly."

Much, then, remains to be done, and those who can give greater safety, and a healthier atmosphere for the collier to work in than he at present has, will indeed be public benefactors. It is, therefore, to be hoped that the time is now at hand when such improvements will be made in mining operations that accidents of really preventable description will be nearly unknown, and when will be realised the remark of Mr. Alexander, one of the Government Inspectors, that "When the fatalities about a colliery are reduced to falls of coal and roof I believe that the minimum of accidents under the system of working practised has been reached."

In common, then, with all persons connected with mining, as well as the general public, we look forward to the Prize Essays by working colliers with a firm belief that the views we have expressed will be ably and practically treated by those who attempt the task of showing how accidents by explosions of gas can be lessened, if not entirely prevented.

SOUTH WALES INSTITUTE OF ENGINEERS.

A special general meeting of the members of this Institute was held at the Temperance Hall, Merthyr Tydfil, on Wednesday, Jan. 24.

There were present—Mr. T. Dyne Steel, M. Inst. C.E. (Vice-President), in the chair; Mr. R. Bedlington, Aberdare; Mr. David Thomas, Rhymney; Mr. J. R. Waddle, Llanelli; Mr. J. M'Murtrie and Mr. Wm. G. M'Murtrie, Bath; Mr. M. Bates, Cyfarthfa; Mr. George Martin, Dowlais; Mr. M. Truran, Dowlais; Mr. Cope Pearce, Cyfarthfa; Mr. Edwin Richards, Chepstow; Mr. C. J. N. Gray, Mountain Ash; Mr. Walter Bell, Merthyr Vale; Mr. H. V. Trump, Rhymney; Mr. H. A. Huzsey, Newport; Mr. Bedlington, Kirkhouse, Cyfarthfa; Mr. T. J. Price, Bridgend; Mr. George James, Risca; Mr. C. James, London; Mr. Hurt, Huxham, secretary; and other gentlemen.

The following rule, to be substituted for Rule 31 of the Institute regulations, was formally passed:—

"RULE 31.—Applications for admission of a candidate as member, associate, or graduate shall be made on a printed form, to be supplied by the secretary, which shall be signed by the candidate for admission, and also by three members recommending him, whereupon the applicant shall be balloted for in such manner as the council shall from time to time direct, and he shall be elected if the majority of the recorded votes be in his favour."

The meeting then resolved itself into the ordinary annual general meeting of the Institute.

The CHAIRMAN regretted the absence of the President (Mr. Wm. Thos. Lewis, M. Inst. C.E.) and numerous other gentlemen, who were that day engaged at a meeting preliminary to the opening of the great arbitration question of the wages paid at the Steam Coal Collieries of South Wales on Jan. 29, and that it, consequently, devolved upon him, as Vice-President, to take the chair that day.

The following gentlemen were balloted for, and elected as members of the Institute:—Mr. Theophilus Criswick, Swansea; Mr. Thomas Jenkins, Neath; and Mr. John Jones, Dowlais.

The CHAIRMAN formally admitted the following members, elected at the previous meeting:—Mr. Thomas Price, Bridgend; Mr. W. G. M'Murtrie, Bath; Mr. Walter Bell, Merthyr Vale; Mr. George James, Risca.

The SECRETARY laid before the members the annual statement of the affairs of the Institute for the session 1870-71, ending Oct. 29 last, from which it appears that the Institute, established in 1857, is in a most prosperous condition, consisting of 184 members, and possessing a credit balance of about 1000.

The office-bearers for the session 1871-72, to replace those going out of office, were then balloted for, and the following gentlemen declared duly elected:—President, Mr. T. Dyne Steel, M. Inst. C.E.; Vice-Presidents, Mr. Thomas Joseph and Mr. David Thomas; councillors, Mr. M. Truran, Mr. B. Kirkhouse, Mr. David Joseph, Mr. David Davis, Mr. H. W. Lewis, Mr. R. W. Laybourne; secretary, Mr. Hunt, Huxham.

In consequence of the absence of Mr. Thomas Joseph, the discus-

sion on his two papers of "The Changing Character of Coal from Bituminous to Anthracite," and "Colliery Explosions in the South Wales Coal Field," was adjourned until the next meeting.

WIRE-TRAMWAYS.

The discussion of Mr. H. W. PENDRED's paper on "Wire-Tramways," adjourned at the last meeting, was resumed.

The CHAIRMAN said this subject had been very ably and fully treated by Mr. Pendred in his paper, and illustrated by numerous drawings, which indicated in a marked degree the advantages of this system, particularly in the transport of large quantities of material over districts ill adapted for the formation of tramroads, or in foreign lands where labour is scarce, and the country is in a state of nature. It is working successfully in several parts of this country, where these advantages are fully experienced.

Mr. HUXHAM said that since the last meeting of the Institute he had taken the opportunity of seeing Mr. Pendred, to ascertain if any marked improvement had been effected in the application of the wire-tramway system. He found that valuable addition had been made to the working powers of the system by the invention of a very simple attachment to the "box-head," that prevented it slipping on the rope whilst going up hill, thus enabling the wire-tramway to be worked at gradients altogether impracticable before this improvement. It consists of two small horizontal eccentric clamps, which are placed one on each side of the rope, within the V groove of the box-head, in such a way that any back movement or slipping of the box-head on the rope causes the eccentric to grasp or bite the rope, and thus keep the box-head from slipping. The result is that the load can now be made to travel on the wire-tramway up steep gradients, which was impracticable before this improvement.

Mr. G. MARTIN enquired what was the greatest height of post that had been used for supporting the line? He knew the wire-tramway was working very successfully in Somerseshire, and he thought it well adapted for conveying ores and other produce over a rough district, where tramroads could not be laid down.

Mr. HUXHAM said that he believed posts as high as from 90 ft. to 100 ft. had been used. He thought it was a matter that only required a little ingenuity on the part of the engineer constructing the line; he saw no practical difficulty in using posts or supports for the rope, if properly constructed, up to 120 or 140 ft. in height.

The CHAIRMAN said the improvement described by Mr. Huxham was of great value, not only because the question of gradient bears considerably on the cost of working, but also because the invention would enable the wire-tramway to be used over gradients inaccessable to locomotive tramroads.

Mr. BEDLINGTON said he saw the wire-tramway working at the last Exhibition, and it seemed to work well, according to the weights carried. He would like to know the heaviest weights that have in practice been carried, and also the cost of transport per ton per mile.

Mr. HUXHAM said the weights carried, in separate loads along the rope, varied from 1 cwt. up to 6 cwts., and he believed the cost of transit, including all charges for engine-power, labour, materials, and interest on capital, varied from 2d. to 1d. per ton per mile, according to the length and power of the line, and amount of work it had to perform.

Mr. J. M'MURTRIE thought the cost would, to some extent, be governed by the gradient and weight carried, for it was evidently cheaper to convey the ore or other material down hill than to take it up against the gradient.

Mr. E. RICHARDS thought it would be very desirable to obtain some definite information from Mr. Pendred, embodying the latest results and details of working cost on some of the lines now at work; and he would also ask Mr. Pendred to supply information as to what the wire-tramways are doing in England, how long some of them have been working, what produce they are carrying, how long the rope lasts, &c. Perhaps by the next meeting Mr. Pendred would be able to supply this information, and be present himself; with this view he moved that the discussion be adjourned.

Mr. DAVID THOMAS agreed with Mr. Richards's remarks. They should have the detailed results of recent actual operations before them, as it was to a great extent a question of comparative cost. He should be glad to see the discussion adjourned to the next meeting.

LACKAWANNA COAL REGION.

The next paper for discussion was that on the "Lackawanna Coal Region," by Mr. R. EVANS.

Mr. M'MURTRIE said the writer stated that in working these beds of coal it was found that the gas did not cause the floor of the mine to heave up, as it did in the collieries of South Wales. He thought the upheaving of the floor in the South Wales Collieries was to be attributed to the weight of the superincumbent strata pressing the pillars into the floor, and causing it to heave up. He thought the cause came from above, and not from the action of the gas below. He was quite aware that two or three cases had been brought before the notice of the Midland Institute of Mining Engineers, where violent issues of gas had taken place in the floor of the mine, but he thought that the reason of there being no upheaving of the floor in working the Lackawanna coal beds was attributable to the shallow depth of the workings, and consequent absence of any great superincumbent weight of strata, rather than the non-presence of gas in the floor.

Mr. HUXHAM thought the description of this coal-field had some bearing upon the paper of Mr. Josephs, "On the Changing Character of Coal from Bituminous to Anthracite," now before the Institute, as it was important to notice that, although the carboniferous or mountain limestone was wanting, yet the coal measures were described as lying conformably on the conglomerate, or millstone grit, resting directly on the Old Red Sandstone. It does not show the immediate proximity of the earlier primary rocks, as in many anthracite districts, but bears a close alliance to the conditions of the anthracite portion of the coal field of South Wales, with the exception of the missing member of the mountain limestone. The character of the seams appear to correspond very closely with those of the anthracite district of South Wales, and the quality of the coal is identical with the best anthracite worked here.

Mr. M'MURTRIE said that the Kilmarnock coal field was much intermixed and broken up by volcanic rocks, but in no case had the coal, which was of a bituminous quality, been converted into anthracite through the action of these rocks.

Mr. HUXHAM said that where trap or basalt rocks intruded into a coal field in the form of dykes, or even where they had partially over-

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ther hand, are not of themselves sufficient evidence from which to determine the productiveness, or otherwise, of the lodes contained herein, but that other conditions must be had recourse to and consulted as essential or primary conditions of the effect which may be produced from the quality or composition of the strata on the lodes found therein, and that these are sometimes found in the lodes themselves, and at others elsewhere—not unfrequently remote from the immediately contiguous rocks in which the lodes lie embedded.

Elkwood, Nye County, Nevada, Dec. 20.

R. KNAPP.

THE MINING FIELDS OF THE FUTURE.

SIR.—The amazing consumption of minerals and metals is causing many to wonder whether the resources of these useful and even essential commodities will run short. I beg, therefore, to address to you this communication in elucidation of the question.

There is a great deal of croaking as to the whereabouts, if anywhere, of our metal supplies, and those of our chief minerals. The exhaustion of our coal fields is now in theme out of fashion. In Nottinghamshire and Shropshire, in positions where none was expected to be obtained, fine fields were opened up; and in Yorkshire and Lancashire, where it was hoped to find it, the hopes have been realised. In Scotland old mines have been re-opened and new ones discovered. There is a large area of brown coal in the Highlands, very similar to that so extensively existing in Muscovy, but in neither place has it as yet been turned to any beneficial account, at all events or purposes beyond mere fuel for the poor.

Ireland could supply the United Kingdom with anthracite for hundreds of years, and has a good store for a long time of household, or, as the Scotch curiously call it, house-burning coal for herself. If the day ever arrives when the people will catch the fish on their shores, compress the peat in their bogs, dig up the coal, iron, copper, tin, and other minerals, and will cultivate a notoriously fertile soil in at least a rational manner, carrying coals to Ireland will be about as much an aphorism and a pun as "carrying pails to Newcastle" is now.

France has coal for sea purposes, and need not import from Wales, but she does not like mining, and Frenchmen make "precious bad" miners. But coal is plentifully strewed throughout her subterranean territory. It is to be found in the east in India, Sattara in the Archipelago, China, and Japan. It is lurking in the Antipodes waiting to be brought to light and to give light, and it challenges industrious search over a large area of the western hemisphere.

Next to coal, iron is the great good of man. There was a time when he used stone arrows, flint hatchets, copper swords, and copper and stone hammers, &c., not because the iron was not beneath his feet, but because he did not know how to get at it. Now he does now, and knows how to marry the coal and iron together, and bring forth the fluid metal, or the wrought, ductile, yet stern iron, the flexible and penetrating steel. Where is he to get it? England is going all over Europe begging for iron ore, as the mines of Great Britain do not produce enough for her furnaces. Spain has helped her; Ireland could give us iron to any conceivable amount. Centuries ago it was her chief industry smelted with charcoal, as is now the case in Russia, and as there also, notwithstanding the presence of coal, whenever the iron was wrought. In Russia every kind of iron exists—from the Caspian Sea to the Ural Mountains, from the north to the south of European Russia. Turkey in Europe and Turkey in Asia are rich in iron. In the Western Hemisphere it bounds, especially along the Pacific side of the Rocky Mountains, which, in the case of coal, so also of iron, the Great Providential storekeeper of man's future supplies has over the world's area piled it up.

The question is often asked, Where is tin hereafter to come from? In Europe there are no known supplies but those of Cornwall. Specks have been found in Wicklow and in Kerry in Ireland; lately in Portugal, and on both sides of the Alps. But, on the whole, there is no prospect of European supply, continental or insular, but what

Some tin has been seen in very small particles in the Himalayas, in the Andes—thus far apart, and along the Cordilleras and the Rocky Mountains tin stones have been picked up, but no mines have been indicated anywhere but in the Eastern Archipelago in the colonies of the Dutch, and from whence, or from Holland rather, we report it. The most likely place to find new veins of tin is Burmah, the British Burmah, and on the Chinese territory not far from where it touches the British and Burmese boundaries.

It is at present probable that many old men amongst us may live to see the day when Cornish tin will fetch even double, possibly triple, its present prices, as the tin of the Straits is very rapidly coming, and no fresh discoveries give promise of increased supply. There is undoubtedly a good time coming for Cornish miners, and for smelters. A mine of tin in Cornwall will be by-and-bye more profitable than an ordinary mine of silver in Bolivia or Peru.

I purpose, with your permission, next week to continue the subject, and, therefore, will not now further trespass on your space.

Gresham House, City, Jan. 31.

THOMAS SPARGO.

WHAT TO SELECT—WHAT TO AVOID.—No. X.

SIR.—From the numerous letters I am continually receiving upon the subject of mining investments, it is clear that a misconception prevails among investors in regard to the marketable value of mining property. Some would appear to be unaware of the fact that in a properly worked mine the reserves of ore are increased proportionately with the scale of development, by which the returns are regulated and the dividends equalised.

By others it would seem to be regarded that the amount of the current dividend should be the basis of calculation as to the value of a mine share, than which nothing can be more illusory. Mines of terminable annuities, whose value is determined by the amount of ore discovered, and the prospective value of the undeveloped ground, rather than by the mere amount of dividend declared. But there are other causes, entirely independent of these considerations, which regulate the value of a mine share—the inevitable law of supply and demand often has a much greater advantageous or adverse effect than even a discovery or a falling off in the mine itself. Hence, the actual price of a share upon a given day cannot always be accepted as a criterion of its real commercial value, for the very obvious reason that it may have been temporarily affected by exceptional causes; for instance, what is known as a "weak bull account"—that is, an account comprising large purchases made on behalf of persons who on the settling-day are unwilling to pay for that which they have purchased—will occasion an active demand during the preceding fortnight, but a sudden relapse follows on the settling-day; whereas, on the contrary, what is known as a "heavy bear account" will depress the price until the settling-day arrives, when, in the event of stock not being forthcoming, a rapid rebound in price ensues. These operations often occur and recur, irrespectively altogether of any change in the mines, and are facts which the *bona fide* investor should watch and profit by, and never allow his opinion of a mine to be unduly influenced as to its future, simply on account of an inflated or depressed market value. Therefore it is not only necessary to know "what to select, and what to avoid," but it is of equal importance to know when the selection shall be made.

It would be an invidious task to point out the many anomalies now existing in the mining market,—how one mine from prospects alone is selling for an aggregate market value of 125,000*l.*, without returning 1 ton of ore, while another returns 70 tons, and realising a fair profit, with splendid prospects as to its future, does not command a greater aggregate value than 18,000*l.*; how another mine is returning dividends at the rate of 13 per cent. upon the present price of the shares, and is selling for 56,000*l.*, while another is making a large monthly loss, yet commanding a market value of something like the same amount. These anomalous facts (and many others of similar character might easily be added) deserve the close attention of those who would be successful in mining investments.

These remarks need scarcely be supplemented by the statement that necessarily follows a mine is without merit because it has no marketable existence, although it must be admitted that a tangibly realisable value is an appreciable advantage, increasing the worth of an investment. There are home mines totally unknown upon the market of real proved merit, but, alas! their name is legion that have neither merit nor marketable value, so that when the selection is being

made these points should be fully considered—the character of the mine, its producing powers, and its marketable *status*, as without the latter (however good the mine) its shares are clearly of less value.

EBERHARDT AND AURORA.—The financial position of this company is to be much regretted, as from information received from the district it would seem that the mines are opening out in a most satisfactory manner. At the North Aurora, in the south drift, running from the Lady's Chamber, an immense body of ore is reported to be in sight, and the size of the ore body increasing daily. It is reported to be the finest body of ore ever developed in the State. The foreman (this is not Mr. Phillipps) estimates the value of the ore in sight at \$250,000—that is to say, this amount of ore has been discovered since the mine was last reported on. The ore body is described as being without limit, neither an eastern or a western wall having been met with. It is reported that an improvement has taken place in the Eberhardt Mine. All I can add is, that although some people would have us believe that the White Pine Mines are worked out, there is before us the incontrovertible fact that during 1871 the White Pine Mines returned silver ore to the value of no less than \$2,500,000.

SOUTHERN AURORA.—The shareholders have acted wisely in accepting the offer of the vendors to refund 40,000*l.*, and to hand over to the company the series of important mines known as the Chloride Flats. This will place the company in a sound financial condition, and provide ample working capital for the thorough development of the whole of the properties. Including the 40,000*l.* from the vendors, there would appear to be an available balance of 56,000*l.*, against which there is a liability of between 4000*l.* and 5000*l.* The honourable course adopted by the vendors is without parallel in the history of joint-stock enterprise.

FRED. W.M. MANSELL.

1, Pinner's-court, Old Broad-street, Feb. 1.

MINING ON THE RHINE.

SIR.—The answers from "Our Correspondent" to "Rhineland" induce me to read over a few of the articles written by "Our Correspondent" on "Mining on the Rhine," and published in your most esteemed Journal, commencing with 1869 to the present date, and I think it will be amusing, as well as instructive, to many of your readers to do the same.

"Our Correspondent" must bear in mind that the promises held out by him to induce the public to speculate in his favourite mines have, thus far, fallen very short of being realised. He very well knows that serious disappointments have already taken place, and ought, therefore, to be a little more civil in his replies. In his last two articles he says a great deal about reports from Freiherr von Huene, Herr Dismann, and several others; but, before proceeding further, I beg to state that I have not read any reports signed by those gentlemen, and, therefore, do not wish to bring their names into the question. I only wish to refer to statements made by "Our Correspondent" in the *Mining Journal*, and as he says so much about facts I can assure him my desire is to be guided by the same.

In September, 1869, "Our Correspondent" writes:—

"The St. Josephsberg Mine was, at the time of my last communication, idled, or nearly so, the only work then in progress being the deep adit, which has been extended into the mountain over 80 fathoms, by means of which three lodes have been cut."

On which he says Capt. Richards reports:—

"In the deep adit, about 35 fms. north of Alexandria shaft, a lode has been cut, with a lead about 2 ft. wide, worth 8*l.* to 10*l.* per fathom. About 10 fms. further north a second parallel lode has been cut through, 3 ft. wide, which I value at 32*l.* per fathom. About 9 fms. still further north a third parallel lode has been driven through, composed of spar branches, mixed with ore and some killas, a part of which may be worked at a profit—a promising lode." "Adjoining this is a caunter. The lode is cut into 15 ft., and is worth about 2*l.* per fathom."

"Since this report the lode has been found to be 22 ft. wide, all rich work, and 2 to 2*1/2* ft. wide—will produce 35 to 40 per cent. of copper."

In the early part of 1870 "Our Correspondent" writes:—

"The St. Josephsberg, the subject of my first letter, so long ago as May, 1867, has, in consequence of that communication, been set at work by a company with 30,000*l.* capital—all the shares well held, and is returning very large quantities of mineral, with the certainty, under good management, of immense dividends."

He then goes on to say:—

"Its two drawing engines are at work, and a 60-in. cylinder engine is being erected, and will be ready for work by April 1*st*, as well as the stone-breaker, crusher, and dressing apparatus. The acid reducing works are in full operation. The company need fear no fall in the price of metals, as a very large portion of the copper ores exceeds 25 per cent. produce, and the poorer ores, being carbonates and phosphates, can be returned at very large profits by the acid process, whilst the lead is rich for silver—a point too much overlooked by the investing public."

"Our Correspondent" does not in the above say anything about *private property*; but, in fact, tells the *public* that they should not too lightly overlook such matters—and yet, strange to say, because "Rhineland" makes some enquiry he turns round and abuses him, and, stranger still, says the company is making *no returns*, but sinking a shaft to get under the rich courses of ore left in the bottom of the 85 fathom level. Well, then, might not any of your readers truly enquire what has become of these immense riches reported from the adit level about two years ago? From what "Our Correspondent" informed us about erecting the dressing machinery, the acid-reducing works, &c., we have reason to think that the company intended to make returns, which undoubtedly induced "Rhineland" to make some enquiry.

I am a well-wisher to the St. Josephsberg Company, and all other mining companies. I only think, with "Rhineland," that the statements put before the public by "Our Correspondent" are much too strong, and are liable to do legitimate mining and honest managers much more harm than good. For example, let us return to the Phoenix Mine. In 1870, "Our Correspondent" writes:—

"Here the lead lode is immensely rich, worth 100*l.* per fathom. The blends also rich, and the lode has been discovered on both sides of the two cross-courses which formerly appeared to bound it, no limit can be fixed as to its value. There are three steam-engines for pumping, hauling, and dressing, and in good repair. All that is here required is vigorous management."

May 4, in the same year, "Our Correspondent" again writes that the agent at the mine states that the leader of 5 ft. wide, solid. "And I can," says "Our Correspondent," "positively assert from personal observation, that it is from 4 to 5 ft. wide."

"Taking, then, the average produce of the lode for the 28 fms. at only 24 tons per fathom, and you have backs laid open 10 fms. high, or 280 fms., producing, at 13*l.* per ton, 71,700*l.*

"By sinking the shaft and extending the levels a like quantity of ground may be laid open and taken away, giving a return from this part of the mine of 142,400*l.* worth of ore."

"There is also here a leader of blends, 3 ft. wide, worth 5*l.* per ton. This of itself at the shallow depth of 4*1/2* fms. would make a profit of 5*l.* per ton. This of itself at the shallow depth of 4*1/2* fms. would make a profit of 5*l.* per ton."

"But, leaving the blends out of the question, and taking no credit for the lead to be raised from the parallel lode recently discovered, it may be fairly estimated that in the first year ore will be returned from the lode east of the cross-course—

To the value of £42,000
From between the cross-courses 143,400

Total £185,400
Monthly cost, 80*l.*; on these increased returns 9,600

Leaving net profit on the first year's working £175,803

This really reads very fine. Why, who could refuse to buy shares? "Our Correspondent," as above stated, says—"All that is here required is vigorous management."

Capt. Richards, a gentleman much extolled by "Our Correspondent," took the management, but failed to pay dividends, or even to make the mine pay its working expenses.

After Capt. Andrews two other gentlemen succeeded each other as managers, but no dividends. I think this enough to convince one that "Rhineland" was not far wrong; and might not all those managers truly exclaim "Preserve me from 'Our Correspondent'!"

"Our Correspondent" now says—"The inadequate capital, and the delays and expenses of the late war, and not the poverty of the mine, were the causes of its suspension." He might also add that the mine has been working again since the war, but no dividends.

Allow me to inform "Our Correspondent" that numbers of mines in Prussia were carried on during the war, and continued to pay their proprietors dividends, which were not half so rich—nay, not a quarter as rich—as he represented Phoenix to be.

Bensberg is the greatest mining district in Rhenish Prussia, and I do not know of any mine in that neighbourhood which suspended operations owing to the war; but I am well aware many of them made regular profits during that period, and I know that there are good mines yet to be obtained in that locality; but I do not know of one for sale with a lode in the adit level 22 ft. wide, all rich work,

and 2 to 2*1/2* ft. wide, which will produce 35 to 40 per cent. of copper—neither do I know any mine for sale or in operation which can be fairly estimated to pay profit on the first year's working of 175,800*l.*

I am a well-wisher to mining, and do not hesitate to say that I know of mines in Rhenish Prussia for sale, which I verily believe, if properly laid open, will pay very good profits on the capital required; but such immense riches as stated by "Our Correspondent" I have not yet seen.—Jan. 25.

A. BERGMANN.

SCIENCE OF INVESTMENT.

SIR.—The circulation of the private and joint-stock banks of England and Wales for the four weeks ending the year 1871 amounted to 29,293,834*l.*; of this sum the Bank of England notes issued amounted to 24,278,216*l.*, leaving only a sum of 5,015,615*l.* of other notes in the hands of the public—private banks 2,678,925*l.*, and joint-stock banks 2,346,687*l.* It will be thus seen that the vast commercial dealings of the country, so far as banking finance is concerned, is based almost wholly on bullion, for the Bank of England had in its vaults the sum of 24,777,888*l.* at the date of last week's returns, and the average amount held for the four weeks ending Dec. 30, 1871, was 24,729,118*l.*, a sum exceeding the entire issue.

What are we to do with our money is a question that almost everyone asks of his friend or broker whenever they meet. The answer is a shrug of the shoulders, and I don't know what. Brother Jonathan, however, has decided for us; and, not content with the sums already exacted for rocky patches of inaccessible hills in Nevada and California, he continues to foist his schemes upon the English public with an avidity that expands with every instance of successful gulling. We have now before us the London and Californian Mining Company, "limited" to 330,000*l.*, of which the vendors exact 280,000*l.*, leaving 50,000*l.* for preliminary and contingent expenses, capital to work the mines, and a margin to cover the commissions that are allowed to brokers, and other charges, even should all the shares be issued. What liberality towards the public! Surely they ought to receive the scheme with open arms, for the agents at San Francisco positively state that "the amount at which the properties are offered could readily be obtained in California," whilst the prospectus asserts that the mines are worth the sum asked!

We heartily agree with the *Times*, that in the absence of explanation it seems strange under the circumstances that the American vendors should prefer taking the trouble to get the money from England. What would this 330,000*l.* do in Cornwall, in Wales, or even in Ireland? In Cornwall, South Cadron has yielded dividends of 345,344*l.*, on 670*l.* outlay; Dolcoath 386,500*l.*, on 46,182*l.*; Tincroft 205,000*l.*, on 54,000*l.*; Carn Brea 300,000*l.*, on 15,000*l.*; East Pool 79,800*l.*, on 315*l.*; Botallack 120,750*l.*, on 18,250*l.*; Levant 140,000*l.*, on 400*l.*; whilst reference could be made to Par Consols, Fowey Consols, the Crinnies, Crofties, Roskears, Tolguses, the St. Ives Consols, and a host of mines that would compare equally favourable. In Wales we have the Van, Cwmystwyth, Lisburne, Goginan, Llangynog, Minera, and many others that would compare favourably with the best of the Californian mines, at present so favourably and reasonably vended to the English public; whilst in Ireland all practical authorities concur in acknowledging her vast mineral wealth, which prejudice and misdirection of capital from home to foreign countries alone deter from being developed. These references to home and foreign mining are pregnant with matter for reflection to all who embark their money in speculative enterprises. There is a species of fascination in gold and silver seeking that permeates all classes of society, yet the student of the "Science of Investments" should remember that copper, tin, and lead are found in bulk in the Mother Country, whilst few in either California or Nevada find a "nugget" which does not cost its worth before attained.

The political hemisphere is somewhat surcharged. American demands will scarcely be entertained, far less complied with. Yet what is 200,000,000*l.* to settle all differences between the new and the Mother Country when English gullibility gives 100,000*l.*, 200,000*l.*, 300,000*l.*, and even 350,000*l.* for a few acres of waste and rocky land of no use whatever for agriculture, the sustenance of man or animal life, or any other practical purpose whatever? France has lost her backbone; the mainspring of her vitality is suspended for an age, the young and vigorous manhood has to a great extent disappeared in open warfare and domestic conflicts, hence France will have few securities to offer to draw English money. Had France mastered Germany a union with Italy would at once have set Europe in a ferment. The growl of the Northern autocrat has been heard in the Turkish divan, and happily for all interested in foreign Government bonds that France has had to succumb, or otherwise the dividends on bonds of Egypt, Turkey, and Italy would have vanished as smoke from a furnace. We, therefore, think that 10 per cent. interest received by investors in these stocks is far below the risks incurred, as they unquestionably are far more hazardous than the standard mines of Cornwall, Cardigan, Montgomeryshire, and other parts of Wales and the Isle of Man.

R. TREDDINICK.
Consulting Engineer.

3, Crown-court, Threadneedle-street, London, Jan. 31.

THE MINERS' WAGES MOVEMENT.

SIR.—There has been for the past few weeks a great stir about the miners' wages and the five-weeks months—some advocating the cause of the miners, whilst others have written and asserted naughty things of them, by saying it is only the lame and the lazy that have got up this agitation for redress; and I confess to a small feeling that that is the class who usually cry out first. Be that as it may, it appears, from the decision of the meeting held at Truro on Jan. 22, that they are to be paid in future thirteen times in the year. Notwithstanding this decision, I am disposed to think there is still a step further to go in order to give the industrious miner fair play. I am informed that in the collieries and in America, where many of our best men have emigrated in the last few years, wages generally rule higher; but there the miner has to work more hours, and in most cases much harder, than in Devon and Cornwall. From my experience, however, as a miner, I consider 8 hours per day quite sufficient for a man to work underground. I have taken the opportunity of conversing with men who have worked in different parts, as to whether the prices given in this country are not in most cases equal to what is given in others, and the inevitable reply is, Yes; but the great evil is we are

take some other bargain in another part of the mine, would you have earned the premium?" The reply was, "Yes, certainly; we should be very sorry to let any men come after us and get more money than we could."

I trust some other writer more able than myself will take the matter up and bring about a reform, when I am fully persuaded there would be no lack of good labourers, and that many of our miners abroad, groaning under their harness (as they, too, are not without their grievances), would return to their native land.

FREE COURSE AND FAIR PLAY.

FIVE-WEEKS MONTHS.

SIR.—Will you kindly permit me to make a remark or two more on what I conceive to be an utter fallacy as regards any benefit to miners from the proposed alteration to four-weeks months? For instance, our setting-day takes place on the last Saturday in every month. We invariably set for the month, and give a fair price "in sight," without reference to the previous month, or "five-weeks month;" and the result is that the men earn one-fifth more in five weeks than in four weeks. On the setting-day we advance subsist on account of the past month, and a fortnight after pay the men; so that they get money twice in the month. We keep only a fortnight "in hand," which is quite sufficient. We find no inconvenience from this system, nor does it require extra aid to keep the accounts; on the contrary, it is a great benefit to the miner, for he goes twice a month with cash in his pocket to purchase food and clothing, and consequently saves at least 5 per cent. per month upon his outlay, which I think amounts to something like 60 per cent. per annum, of which he is robbed by the present system of long payments, being compelled thereby to purchase his food and clothing on credit. As before remarked, we have our setting-day on the last Saturday in the month; the men have then sufficient time to return and take out tools, and are ready for their work on the following Monday morning. We have no "mazed" Mondays.

I am surprised that shrewd Cornish miners cannot see through a thicker veil than the transparent philanthropy of their pretended friends, who have originated the movement of altering calendar into lunar months. If monthly men have not sufficient wages give them more, but give miners always a fair price "in sight" and extent for the month, and give them subsist on the setting-day, and pay them a fortnight afterwards; and then there will be an end to the delusion of benefiting men by the proposed alteration. An agent can give an unfair price for four weeks setting as well as for five, and the miner under the new system will find himself at the end of twelve months no richer than he was before. A MANAGER OF MINES.

County of Cork, Jan. 29.

MINING IN GWENNAP.

SIR.—In my letter to you about a fortnight ago I omitted to mention the name of a mine of great promise—West Wheal Jewell, near the village of St. Day. This mine is in the manor of Tolcarne, the property of the Duke of Buckingham and Mr. Charles Trelawny. Grants from these lords were made to Mr. Matthew Greene, of Pincher's Hall, Old Broad-street, London, at 1-20th dues, in 1869. There is a steam pumping-engine at work (a 64-in.) draining the mine to 44 fms. below adit. The shaft, which is 13 fms. deep, is being cut down in preparation for drainage to that level. It is said that at the 57 there is a rich course of tin, like that found at the 42. There are in the sett seven known lodes of fair indications. Hitherto the tin raised has been sold in stone—the quality being peculiarly rich, the same in stone having realised about 63 per ton, which is a price unparalleled in the history of mining. The whole production, on an average, realises 51 per ton. When the company have secured stamping apparatus for returning the tin on the spot considerable advantage will be derived. The stream formerly used by the late company is now used by a clay-works company close by, whose tenure I hear will shortly expire. I congratulate the company on their prospects. The manager is Captain Joseph Mitchell, whose intelligence as a miner is recognised in the parish. He is also the manager of Cathedral Mine, in the same manor. The engine here was set to work on Thursday last, and works well. The prospects here are good for both tin and copper. In this sett there are 15 lodes, including those in Wheal Damsel, West Jewell, and Roseclough (alias West Gorland), where the prospects are also very good. This last-named mine belongs to, and is managed by, Captain John Mayne, late of West Jewell.

Wheal Unity Wood Mine, formerly in Gwennap and Kenwyn, is now solely in Kenwyn, the Gwennap portion not being granted to this company. This mine is managed by Capt. George Tremayne—prospects good.—Truro. R. S.

THE CHACEWATER MINING DISTRICT.

SIR.—Mining in the neighbourhood of Chacewater is on a much better footing than it has been for some years, and a few particulars may not be uninteresting to your readers.

At GREAT WHEAL BUSY they have already made a start. A new 90-in. engine has been ordered from Williams's Perran Foundry Company, to be delivered on the mine by June 1, for the sum of 4300. A second-hand 76-in. engine has been purchased from Messrs. Lanyon and Son for 725l., and a 26-in. winding-engine from Chiverton Valley, for 700l. Capt. Martin Pope, of Carrarhawk, is the resident agent, and under his supervision the work will, doubtless, rapidly progress.

At WHEAL DANIEL they are in fork 4 fms. under the 38. A plunger is fixed at the 32, and they have commenced to case and divide the shaft. In the winter sinking from the 12 to the 18 they have a splendid tin lode, worth at least 90, per fathom, and they are now engaged in driving a cross-cut from the 18 to intersect it. Shares are 75l. to 75l. If the manager will take a gentle hint, would it not be well for him to publish in your Journal from time to time his report on the condition of the mine? As it is the shareholders have no authentic report, except at the general meetings, and, as they are held at intervals of three months, we are left for a long time in a comparative state of darkness. I hope Capt. Goode will take these remarks as written in a friendly spirit, and in no way attempting to find fault with his management of the mine, than which nothing could be better.

CREGBRAWSE is rapidly improving under the management of Capt. James, a steam-wlm is to be erected here to supersede the old and costly horse-labour.

POLDICE will find itself in a mess unless the new 85-in. engine is erected very quickly, as the present engines are going at their utmost speed, and I have been informed on good authority that the water is rising 2 ft. every 24 hours.

Of Unity Wood, Burra Burra, Wheal Prosper, and the proposed testimonial to Messrs. Buckingham and Ninnes, I shall have more to say at a future time.

CHACEWATER.

GAWTON COPPER MINE.

SIR.—I notice Gawton Copper Mine shares quoted to day at 5½ to 6—a fall since the dividend not very heavy, it is true. Are the investing public really aware of the prospects of this mine, and of its present riches? It has 9500 shares (originally 4000). It makes a profit of 400l. a month (see sales and returns). Let us call the mine 67. a share, and we have 24,000, (at that price) as its market value: 400l. x 12=4800l. per annum as interest on the capital of 24,000l., just mentioned—that is, 20 per cent. dividends. It is expected that the deep level will run into a mass of copper ore—the junction of two lodes, gradually coming down in a diagonal direction, right and left of the shaft, one crossing the River Tamar, under its bed of course. These rich lodes have been regularly traced underground, and are but the continuation of rich lodes in other adjacent mines of great wealth. A rise in copper would soon change the price of Gawton shares. Again, the reports issued are very satisfactory; all the levels and cross-cuts average 10 tons per fathom, and would appear to indicate improvement as the levels approach the mass of ore anticipated in the junction aforesaid. I know of no mine with more brilliant prospects or safer as a splendid investment than Gawton Mine. Enquiries at the office always meet with courteous attention. A magnificent plan shows what is being carried out underground. I can only say that the real price of Gawton shares at this moment ought to be 10, and if the copper is cut (as expected at any hour's notice) the rise will be very great, and will upset the jobbers who try to depreciate a splendid property in a most unwarrantable manner for gain sake. Perhaps of all the mines in the Dividend List (Gawton has just paid a 5s. dividend quarterly, and has plenty already in hand to pay another at 6s. if desired) few other mines stand more promisingly forward as a safe investment than Gawton Copper Mine. VERITAS.

London.

THE LATE CAPT. JAMES LESTER, OF PONTERWYD.

SIR.—It is with feelings of deep regret I beg to inform you, that poor Captain JAMES LESTER, of the Gogerddan Arms, Ponterwyd, died on Wednesday last. I am sure his many friends in Cardiganshire all can bear witness to his ability as a miner, and to his honest, straightforward, and honourable character as a man, particularly in all matters connected with the mineral sets of the country, and this was so evident to the highest authorities that he was frequently called upon to report upon the Crown lands prior to granting of leases. Having been interested in mining in Cardiganshire for several years, in connection with the late Capt. Lester as my agent, I feel a melancholy pleasure in paying this tribute to the memory of a very deserving man, and hope you will insert this in your valuable Journal.—London, Jan. 29.

J. LA MERZ.

THARSIUS SULPHUR AND COPPER MINING COMPANY.

SIR.—Being a shareholder in this company, and, at the same time, a reader of the Journal, may I inquire how it is that I can never find the slightest allusion to my property in your paper? It may be, and I suppose is, the fault of the directors, but it cannot fail to be a considerable inconvenience to the English and Irish shareholders.

The Tharsius Sulphur and Copper seems to be a company little known except in Scotland, but to be one of the soundest and best paying concerns in the market. For the year 1870, in spite of the low price of their produce, and a considerable outlay on railway and harbour works, they paid a dividend of 10 per cent. on their immense capital, which is either a million or a million and a half sterling. What may we expect for the past and present year now that the price of copper is so different, and little or no money has been spent on the works above alluded to?

Almost the entire business in the share of this company is transacted in Glasgow, but they have lately been introduced into the Dublin market, and with

great success. A friend of mine bought some 100 shares last November at 18s., and they are now quoted at 29l. The Tharsius Mines are situated in the South of Spain, and the pyrites is worked in an open quarry, and conveyed by a short railway to the shipping port, but I must refer such of your readers as are anxious in the matter to the directors' report, published last April.

C. E. DUBLIN.

MINERAL HILL MINING COMPANY, NEVADA.

SIR.—I notice two communications in last week's Journal respecting the Mineral Hill Mines. The first, from "R. S.," asks why the Mineral Hill Bonds are at a discount while the shares are at a premium? The second, in the Supplement, from Mr. Thos. H. White, formerly of Penzance, Cornwall, I think explains the apparent anomaly. Mr. White says the ore of Mineral Hill "is found in nests, which are speedily worked out." If this is the case, the shareholders may get their capital returned three or four times over, and the poor bondholders will have but a gilded mine left them as security for their money.

JOSIAH CHILD.

TUOLUMNE GOLD MINING COMPANY.

SIR.—This company possesses, or is said to possess, two valuable mines, the Grizzly and the Martin. At the meeting held on Jan. 8 it was stated that the Martin was "shut down," but that in the Grizzly a vein 6 ft. in width had been discovered, 3 ft. of which was quite rich. Such being the case, would it not be better for the interests of the shareholders to sell the Martin, and with the proceeds of the sale work the Grizzly vigorously? I, for one, am sick of being urged from time to time to take up my proportion of allotted shares at 2s. fully paid.

SHAREHOLDER.

PUDDLING IRON, NOT BY MANUAL LABOUR.

SIR.—The importance of puddling iron by mechanical manipulation instead of manual labour is a question that admits of no concurring, simply because it is based upon a monetary foundation; and this arising from manual labour being fettered with Trades Unions, and their inability to classify and make skilled labour, hence the change is an actual consequence, and is brought about by the short-time movement, and the result will be—more machinery, less manual labour, and a reduced price in production.

There can be but one way in puddling iron, and to do it effectually is the essence of the whole question; therefore, as puddling is to work the phosphorus and impurities out of the metal, a machine or apparatus is a *sine qua non*, capable of stirring up the metal from bottom to top, and side to side. There is no doubt but the man will be forthcoming equal to the task; but as the question is one of money and experiment until the proper way of mechanical puddling is accomplished, the iron trade will have to content to potter on with manual labour, slave, as it is, to the grog shop, theatre, &c., thus resulting in half-a-day's labour for a day's wage, and the employers of labour driven to their wits' end to get remuneration for capital, &c., will be forced for self-preservation to not only resort to all the machinery they can adopt and employ, but to put the manual labour part on to piece-work, thereby doing away with day wage *in toto*, as to reduce the basis of labour means so much per cent. Increased wages, be it one or two hours in ten. This point gained, then it will be increased wages for decreased out-turn of work, the British nation being the sufferer, and the gin and stout brewers the persons most benefited, from the fact that intoxicating liquors, tobacco, and adulterated food are the greatest destroyers of manual strength; hence the decrease of stamina to stand a day's work can only result in masters being bankrupts and operatives paupers when panics and stagnant trade predominate.

JOHN CLARE.

The Inventor, Patentee, Designer, Promoter, and Upholder of England's Iron Navy since 1853.

[For remainder of Original Correspondence see to-day's Journal.]

DEVONSHIRE GREAT CONSOLIDATED COPPER MINING COMPANY.

The following is a copy of Captain James Richards' four-monthly report, shewing the present state and prospects of these mines:—

Jan. 25.—WHEAL MARIA: At Capelior the mine has been drained to the bottom or 40 fm. level, which level has been driven a few feet, the lode proving small, and composed chiefly of hard capel. The only point now in operation in this part of the mine is the driving of the 12 east, in which the lode is of good size, composed of capel, mundic, peach, quartz, and good stones of copper and tin ores, and we are looking forward to an improvement as we approach the cross-course, some 130 fms. in advance of the present end. To the north of the Capelior lode, about 200 fms., we have laid open another lode for 220 fms. in length, which proves to be strong and promising, varying from 2 to 8 feet in width, composed of capel, quartz, mundic, gossan, and traces of both copper and tin ores, altogether very encouraging.

WHEAL JOSIAH.—Highcliff's Engine-Shaft, South Lode: The stripping down the lode in Cole's winze below the 18° has been continued, the lode for the last 6 feet falling off from 20 tons to its present value, 5 tons, or 20 ft. per fathom.—Agnes Engine-Shaft: In the 144 west the lode has for the last 6 fathoms been greatly disturbed by small cross-courses, and for the present there is no lode in the end. It is most probably thrown to the north, and the drivage has been in that direction for the prior thereof. The new south lode shaft has been sunk to the depth required for the 130, and at this level both top and trip-plats have been cut complete.—New South Lode Shaft, New South Lode: In the 130 west the lode is 3½ feet wide, composed of capel, quartz, and saving work of copper ore. In the 130 east the lode is 4 feet wide, and worth 1 ton of ore or 20 ft. per fathom. In the 115 west the lode has for some fathoms been small—1 ft. wide—and in the present end it is only 6 in. wide, composed chiefly of hard capel, quartz, and a little mundic and copper ore.

WHEAL EMMA.—Thomas's Engine-Shaft: The 216 has been driven west altogether about 20 fathoms, chiefly by the side of the lode, which has, however, been cut into at intervals for a few feet, where it proves to be composed of hard capel, quartz, and a little mundic and copper ore. We have some 20 fathoms further to drive to come back under the ore ground gone down in the level above.

Inclined Shaft: In Alford's cross-cut south at the 109 west, the ground continues favourable for exploring, and congenial for mineral. This cross-cut is now out beyond the new south lode about 50 fathoms. The railway shaft is in regular course of sinking, and is down about 12 fathoms below the 130, good progress still being made, and we hope to reach the required depth for a 145 fathom level by the end of another month. This shaft is between two parts of the lode, and the south portion has recently been cut into, proving 18 in. wide, and worth 2 tons of ore, or 10 ft. per fathom.

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Agnes Engine-Shaft: In the 144 west the lode has for the last 6 fathoms been greatly disturbed by small cross-courses, and for the present there is no lode in the end. It is most probably thrown to the north, and the drivage has been in that direction for the prior thereof. The new south lode shaft has been sunk to the depth required for the 130, and at this level both top and trip-plats have been cut complete.—New South Lode Shaft, New South Lode: In the 130 west the lode is 3½ feet wide, composed of capel, quartz, and saving work of copper ore. In the 130 east the lode is 4 feet wide, and worth 1 ton of ore or 20 ft. per fathom. In the 115 west the lode has for some fathoms been small—1 ft. wide—and in the present end it is only 6 in. wide, composed chiefly of hard capel, quartz, and a little mundic and copper ore.

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Royal School of Mines, Jermyn Street.

[FROM NOTES BY OUR OWN REPORTER]

LECTURE XVI.—I have now (said Mr. SMYTH) to bring before a different part of the subject of mining—the modes in which miners have to attack the ground for the purpose of making excavations either in shafts or levels, or in other forms. This portion of our subject, which need not occupy us very long, is necessary an introduction to what follows, partly because it is important to know practically the different implements employed, and partly, to gain a knowledge of the various practices in use, to judge of the native economy of working in different ways through various kinds of ground.

The especial difficulties of making way through rocks of different kinds cannot be judged only by their comparative hardness. In some places they are apt to be mingled one with another; in other places decomposition gives the natural character of certain rocks usually hard to comparative hardness, thus we must temper our ideas as to hardness, properly so called, by knowledge of the circumstances in which they are placed. The very hard substances are frequently found to have planes of division of some kind or other, so as to give the miner's tools an advantage, and to enable him to break them in succession. The quality of a greater or less degree of cohesion on a large scale is a point of the utmost importance with regard to the ability with which mineral substances can be worked. Rocks with a hardness equal to that of steel if they are cracked and fissured may, by taking advantage of such faults, as we speak, and by the assistance of gunpowder, be worked quite easily. It is convenient to bear in mind the different sorts of ground according to the use of the various kinds of implements, or group of implements, which will have been employed in dealing with them. We can begin with those most easy in treatment. Our first group, then, will be "loose or running ground," or what Germany is called "rolling," which means that if you take away a shovelful we will run down than is removed. The difficulty of ground of this sort is in the working so much as in the prevention of the material running down, and the necessity of holding it back by timbering or walling, so that men can work on in security. Under this head comes various kinds of quicksand, which have to be passed through, whether horizontally or vertically. As we were attempting to make an adit or gallery, and came to a chasm filled up with quicksand, or the bed of an ancient stream, the moment it is cut the material rushes into the levels. Again, when descending from the surface we get into a quicksand, the sides fall in, and the excavation is filled again, a phenomenon especially noticeable in the lower red sands of what is called the Permian formation. In all these cases the ground must be secured by gunpowder; but in collieries where fire-damp is present the use of explosives is most dangerous. Then the wedge should be brought into play; and of late the hydraulic wedge of Mr. Bidder has been introduced with good effect. Another system of wedging is used in quarries, where, it having been discovered in what direction the stone is likely to rend, a trough to a small depth is cut, and then a series of wedges put in all along the line, and these being struck simultaneously, or in rapid succession, generally bring off large masses. There are old workings in existence which prove that the ancient Egyptians put in wedges and worked exactly as they do, gunpowder excepted, at our granite quarries to this day. A plan called "ping and feathers" is also used in some places. A bore-hole is made, into which side-pieces are put, and wedges driven down between the side-pieces. The effect is that the mass is rent off with greater evenness.

LECTURE XVII.—Our last lecture (said Mr. SMYTH) was considerably occupied with the implements used in dealing with ground which may be wrought without the aid of gunpowder—the pick, and the hammer and wedge, which we have seen in older periods were the sole reliance of miners, assisted in some districts by the process of fire-setting; while in the present day many of the stratified deposits, and especially coal, are wrought by implements of the same kind. It may be asked, as, indeed, it has frequently been asked, whether some at least of these works, which are extremely laborious, could not be performed by machinery. The question has been raised again and again in these days, when in even small mines, as well as in the largest, steam plays so important a part in winding and pumping, and various attempts to construct suitable machinery have been made, but up to the present time none of them can be pronounced to have been entirely successful. Many years ago Mr. Peace, of Wigan, considered that the swing of the miner's arm by which the pick is wielded in hoisting and shearing the coal might be attained by machinery. Looking at the softness of the material it does seem reasonable that it might be accomplished by some mechanical contrivance. As I have already mentioned, the first process in coal getting is to undercut or undermine the bed (all the mineral thus cut out being waste), after which it will sometimes not stand to be sheared, while in other cases it has to be pushed down, as it were, by mere force; and it is believed that if the first process could be carried out by machinery, the quantity of waste would be greatly lessened. I must, however, point out in passing that coal may have a parting in the middle, and it is possible to have the hoisting done on the parting, and so not injure the seam. This actually occurs in the Forest of Dean, and where it is necessary to get out the parting so as to prevent the admixture of deleterious material with the fuel, and enable the men to send up nothing but clean coal. When this has been done the next operation is to wedge down the upper piece on to the lower, and then remove it bodily. This being done, the miners start on a fresh piece. The ordinary state of things, however, as I first stated it, Mr. Peace constructed a machine for hewing, which was called the "Iron Man," but it never was cordially taken to by the miners, and soon became only a tradition. Of the more modern machines, several which have been put into the collieries are said to have had a moderate amount of success. There is no doubt where the circumstances are favourable for their application, when the machinery is kept in good order, and worked by compressed air or other power, they do an amazing amount of work as compared with what can be done by manual labour. The simplest, and therefore the best, of these machines are of the principle of the pick. They are mounted on a frame, which can be made fast to the walls so as to have a firmer purchase, and then a strong iron pick is worked backwards and forwards, operating on the lowest part of the seam. This very rapidly cuts out a certain length to a depth of from 3 to 4 ft., and with a height of only about 18 inches, which gives a sufficient hoisting. The machine runs on a rail, and one man is enough to attend to it, but it will do as much work as from 10 to 20 men in the same time. This, as I have said, is when all is favourable, and the machine in good order, but there are complaints that it is apt to get out of order, and thus to lose a good deal of its power. Several of these machines are patented, and perhaps it would be unfair to mention names at present, but those which seem likeliest to be practically useful depend upon the pick action. There can be no two opinions as to the advantage of hewing by machinery. The workmen are not exposed to any danger by falls of coal, while when hoisting is done by hand labour they are in jeopardy every moment, and especially where they are careless as to putting in sufficient props. And again, whereas the hewer must cut away enough in height (say, from 18 in. to 2 ft.) for him to lie on his side and work his pick, and so make a great quantity of small coal, of little or no value, the machine does the work with equal efficiency, and at a third or a fourth amount of waste.

In the harder rocks blasting is an admirable aid to the miner, and these other classes of ground—termed "fest" in Germany, and shooting or blasting ground in England—constitute the largest proportion of the rocks in which mineral veins are worked. The processes of blasting used here are also used in working certain coal seams, on account of the superior cheapness with which operations may be carried on. The German term "fest" applies generally to rocks similar to our third group, but with fewer joints, or planes running through them of which the miners can take advantage. They consist of the harder kinds of kyllas, granite, and older clay-slates, a peculiar hard kind of slate, called "grauwacke," and mica-slates, in which many regular deposits, as well as lodes, occur.

Another class of rock is that which is of excessive hardness, termed "tight" or "close," as well as hard. It comprises certain syenites, greenstones, and quartz, with the metallic sulphides which in some kinds of veins it is desirable to work, and gneiss. The Swedish and Norwegian rocks are often of this extremely hard character, so that very frequently no tool will operate upon them, and then the old practice of "fire-setting" is used. That practice is kept up in a few districts on rather a large scale. When the rock is so very hard it may far to take away all chance of the work being a paying undertaking. I knew in Cornwall where the cost per fathom for driving was 30s. Neither is it an uncommon practice in some districts, and mines might be mentioned where it costs 50s. to 50s. Unless, then, in such cases a large proportion of ore is not met with, it is impossible to work with advantage, and the comparative cheapness of wood probably the reason why in Sweden blasting has not superseded fire-setting.

With regard to the implements used I have already mentioned in the first lecture the pick and shovel, and to these must be added barrows, or barrels, for lifting the material. These are found to vary very much in Spain and Portugal, where it is difficult to introduce any new system, and where to this day the material is carried out by hand, or in baskets made of esparto grass. In many districts trays of wood are used, which are made to drag along the floors of the excavations. In this country barrows are used of various forms of construction which the best examples may be seen in railway cuttings and other works, while the long-handled and short-handled shovel I have mentioned, another is used in the stream districts, where tin or gold is to be got from the gravel sand, made with bars and openings between them to act as a kind of riddle, and to let the finer portions of the material pass through. This implement is called a "streamer's fork." Within the last few years an excellent and prize-winning work has been brought out by Mr. W. Morgan, of Bristol (published by Pickstock), which contains a series of drawings representing all the mining tools, and that, too, with an amount of minute detail which cannot be given in lectures, which are intended rather for the purpose of pointing out general conclusions than matters of simple detail.

In easy or fair ground, in which implements of a pointed form can be used, a pick comes into play. This is a most important implement in mining, and a good deal in character. Sometimes the miners have to work in a very confined space, his object being to get the lode with as little of other material as possible, and what is called a "pole-pick" is then used. It may be used as a wedge as well as a pick, the helve acting as a lever. In mines where the pick is very much rolled on, and where there is more room, it is not uncommon to confine the single-pointed pick is employed very largely, and the purpose of getting coal. It is not used in England, except on certain beds of anthracite in the coal measures, where somehow or other the one-pointed pick is the fashion. In our collieries no single pick is ever used. In fact, the two-pointed pick is the collier's implement par excellence; but as we pass from one point of the country to another it is curious to see the variations in size and shape of the pick, according to the nature of the ground. When coal is to be got the usual mode of getting it is by hoisting, undercutting, or kyring. This is done by cutting a lateral opening at the bottom, as far as can be reached; the upper part is then hoisted by what is called shearing, and falls down. The collier first has to lie on his side, and wield his pick horizontally, cutting back into the coal as far as he can reach, and by as narrow an opening as possible. All he picks out in little bits, and is reduced to what are technically called "small," or "ast." The pick for this purpose is necessarily a light one, and the collier when he has finished hoisting lays it down, and takes up a heavier one for the purpose of shearing, which is making a similar cut at the end of the place of working. The seam be thin the hoisting may have to be done upon the stratum on which the coal rests, and then the collier uses what is called a stone-pick, which is heavier, and necessarily, because the material which occurs with the coal is generally of a more indurated character, whether it be stone or shale. Picks are called mandrills in South Wales, pikes in Staffordshire, and slotters in some other districts. The handles are generally from 22 to 30 in. in length, and the heads have on the undersides with the shaft. In South Wales they are much longer than the half, to suit the work they have to do; and so at the Box Stone Quarries on the Great Western Railway, where they want to make the plane of separation as long as possible before they begin to remove the stone, the helve of the pick is 6 ft. in length. This renders it necessary for the workmen, when he has made the stroke, to let the head of the pick rest on the lower side of the opening until he has balanced it again for the next blow. A curious substitute for the pick is used in some sand pits, where, as it would be dangerous to work too near, they have an implement 16 ft. in length, with which they prod the face of the mass until the mass falls, and is then removed, when the process is repeated. In the North of England, and particularly in Westmoreland, Durham, and Northumberland, the implement most used is what is called an anvil-pick, the shape of the head being something like an anchor; and the men there say that they can work much better with them than with other shapes, but it is so easy to tell why. Picks of a heavier character are used in dealing with sandstones and granites, where the work is to cut grooves rather than to break the material down.

The next group of works are wrought with the same class of tools, but with the addition of the hammer and wedge, implements with which a vast amount of the hard ground in the older time was broken away, but which are now to some extent superseded by gunpowder. In the older mines some really beautiful specimens of work with the pick may be seen, particularly in the limestone rocks, and, although executed a great number of years ago, are still in excellent preservation. Examples of this sort may be seen in the rock-salt mines of Cheshire, where the rock-salt is still got by hoisting and shearing, assisted by gunpowder. The wedge is made of a description of metal called gad-steel, from its

excessive hardness. The tributaries of Cornwall and Devon exhibit an amount of skill in the use of the gad, oftentimes fixing it with a single blow where they can bring down a great deal of rock. Before the introduction of gunpowder these implements had to be employed in all the hard rocks. In Saxony and Hungary the steel gad now employed is almost identical with the most ancient ones of which we have any knowledge. When the first gad is driven in with the hammer till it is buried, a second and larger gad is introduced, and so on till the mass is splintered off. In Saxony, where the miner goes to work he has a string of gads upon a steel strap over his shoulder, which leaves his hands at liberty for ascending and descending the ladders. The hammer and wedge are still used in some parts of our own country, where such work is rendered needful by an influx of water, which makes it too difficult to put in charges of gunpowder. In these cases, however, where they sometimes have to work through from 6 to 12 in. of water, a long wedge is used, otherwise called a poker.

Where coal has to be broken down we have seen that the system of working adopted brings in the aid of the weight of the material—that is to say, being undermined, the superincumbent mass has a tendency to come down by its own weight, without proper precautions. This renders the work extremely dangerous, and many men every year lose their lives by neglecting the simple precaution of putting in what are called sprags, or small props, where the hoisting is going on, to hold up the mass overhead until the undercutting has been carried far enough. As the workmen are so neglectful of their own safety, there should be a proper supervision, so that every working place may be properly spragged. Some people say that this propping should take place according to Act of Parliament, and that there should be a system of legal coercion; but considering the great variety of conditions in which the coal is found and worked, and the impossibility of regulating the propping of one place by the requirements of another, it seems to me inexpedient to invoke Jupiter in this matter, when the true remedy for the evil is for the men to put their own shoulders to the wheel, and to be ready to secure themselves, when the means of doing so are simple. In cases when the coal adheres firmly to the roof it is brought down by gunpowder; but in collieries where fire-damp is present the use of explosives is most dangerous. Then the wedge should be brought into play; and of late the hydraulic wedge of Mr. Bidder has been introduced with good effect. Another system of wedging is used in quarries, where, it having been discovered in what direction the stone is likely to rend, a trough to a small depth is cut, and then a series of wedges put in all along the line, and these being struck simultaneously, or in rapid succession, generally bring off large masses. There are old workings in existence which prove that the ancient Egyptians put in wedges and worked exactly as they do, gunpowder excepted, at our granite quarries to this day. A plan called "ping and feathers" is also used in some places. A bore-hole is made, into which side-pieces are put, and wedges driven down between the side-pieces. The effect is that the mass is rent off with greater evenness.

THE PROBABLE DURATION OF THE WIGAN COAL FIELD.—An interesting paper has been read before the members of the Wigan Field Naturalists' Society, by Mr. Perrins, one of the leading mine surveyors of that town. The lecturer introduced his remarks by treating of the lowest practicable depth at which coal could be worked in the district, and upon this point he said the famous colliery at Rose Bridge, Ince, which had the deepest shaft in Great Britain, had contributed some most valuable information, and enabled calculations to be made as to what depths could be reached, which were otherwise mere theories. The depth of this shaft was 806 yards, and it had been shown that the increase of temperature from the depth of 161 yards, at which it was 61° Fahr., to 203 yards, was at the rate of 1° for each 11 ft., from 203 yards to 605 yards at the rate of 1° for each 36 ft., and from 605 yards to 806 yards at the rate of 1° for each 44 feet, showing a considerable increase in the rate at the greater depths. Supposing the rate of increase to go on in a similar increased ratio, the temperature at 1000 yards deep would probably be 113°, and 14° at 1200, which he thought would be found a sufficient obstacle in itself to prevent any deeper workings. He had, therefore, assumed that the Arley Mine, which was the bottom seam in the above shaft, was the lowest practicable mine in the district, and this he estimated would be available over the whole area. This mine was the lowest of the middle or most productive coal measures, and the series below contained only a few thin seams of coal at distances of from 200 to 300 yards apart, so that when they got below the Arley their coal seams might be said to be exhausted. Proceeding to the more direct object of his paper, Mr. Perrins said that for the purpose of his enquiry he had selected as the area of the Wigan coal field the district embraced within a radius of two miles, taking the Wigan parish church as the centre. There were about 12 workable seams, although in some portions of the district several of these had been lost by upheavals, which were known as the Ince Yard Mine, the Ince Four-feet, Ince Seven-feet, Pemberton Five-feet, Pemberton Four-feet, Wigan Five-feet, Wigan Four-feet, Wigan Nine-feet, Cannel or King Coal, Yard Coal, Smith Coal, and Arley Mine. After describing these seams, the geological position of the town, and the various faults in the district, he proceeded to dwell upon the prospects of the future as to the local coal supply. The Wigan coal field he divided into five belts. First, the Pemberton belt, with a superficial area of about 610 Cheshire acres and eight workable seams, of which the original yield he estimated was 35,340,000 tons, of which 14,060,000 had been gotten, and 21,280,000 tons remained to be gotten. The next belt extended from Brynn Mors on the south, through Poolstock and Wallgate and Pagefield to Douglas Bank on the north, and continued in a direct line to Standish Hall, the surface area being about 1060 Cheshire acres. This belt, containing from 11 to 12 workable seams, was the one to which we must look for the greatest supply of coal in the future in the area under consideration. The original yield he estimated at 81,600,000 tons, of which 29,400,000 tons had been gotten, and 61,200,000 tons remained to be gotten. The third belt, which might be termed the Wigan belt proper, as it embraced the heart of the town, had seven workable seams, and he estimated had an original yield of 35,450,000 tons, of which 25,125,000 tons had been gotten, and 14,325,000 tons remained. The fourth belt extended from Strangeways, in Hindley, on the south, through Anbuswood Common, Ince, top of Scholes, to Leyland Mill and Brook Mill's on the north. Rose Bridge Colliery was in the centre, and twelve workable seams had been cut through. The surface area was about 800 acres, and the original yield he estimated at about 62,880,000 tons, of which 28,300,000 tons had been gotten, and 34,580 tons remained to be gotten. The fifth belt, in which the Kirkles Hall Colliery and several other extensive collieries belonging to the Wigan Coal and Iron Company were situated, only contained about three or four valuable seams, to a net workable area of 350 acres. The original yield he estimated at 12,600,000 tons, of which 8,400,000 tons had been gotten, and 4,200,000 tons remained.

The total original yield of the field he estimated at 231,810,000 tons, of which 96,285,000 tons had been gotten, and 135,585,000 tons remained. He estimated that the coal within the area was being got at the rate of about 2,600,000 tons per annum, and, assuming this rate of get to continue, and he did not think it would be increased, the quantity of coal remaining would last a period of about 52 years. This exhaustion would, however, be a gradual process, and its effect upon the town would be produced slowly and almost imperceptibly. The number of colliers employed in raising the above quantity of coal would be about 6500, making the total, with surface men, of about 7000, earning something like 9000 per week, and the withdrawal of this from the town must have a deprecating effect upon the place generally. There was, however, one hopeful prospect before the town, at least so long as the coal period continued, and that was the rapid import which was being given to the iron trade, which had recently sprung up amongst them; and it was to be hoped that when the time came that the local coal supply was exhausted, some other local source of wealth might be discovered.

CARR'S DISINTEGRATOR AND PULVERISER.—At the Institution of Mechanical Engineers meeting the first paper read was a "Description of the Disintegrating Flour Mill, and Machine for Pulverising Minerals, &c., without grinding, crushing, or stamping," by Mr. THOMAS CARR, of Bristol. In this process of disintegration, the particles of the material operated upon are shattered in mid-air by a succession of blows delivered with extreme rapidity in opposite directions, and are thus pulverised by the force of the blows alone, without being subjected to the compression or friction which accompanies the ordinary processes of grinding, crushing, or stamping the material between two surfaces. The disintegrator consists of a pair of circular discs rotating in contrary directions upon two shafts situated in the same line; the opposing faces of the discs are studded with a series of short projecting bars or beaters, arranged in successive concentric rings or cages; and the rings of beaters fixed in one disc intervene alternately between those fixed in the other disc, and revolve in the opposite direction. The material to be pulverised is supplied through an opening in the centre of one of the discs, and receives from the innermost rings of beaters a centrifugal motion, propelling it towards the circumference of the discs; in its course through the machine it encounters successively the several rings of beaters revolving alternately in opposite directions at a high speed, and the particles are thus dashed violently by each beater against the beaters in the next outer ring running in the contrary direction, whereby the material is effectually broken up and reduced to powder. In this mode of action, by the free blows of the beaters upon the material, the friction and compression between the machine and the material, which are involved in all grinding, crushing, or stamping processes, are avoided, as the material is not acted upon between a pair of surfaces; and the whole force of the blows given by the revolving beaters is usefully expended in pulverising the material. Disintegrating flour-mills upon this construction have now been a year in regular work with complete success, a single machine of 7 feet diameter being found to do the work of 27 pairs of millstones, and to produce the same percentage of flour from the wheat, with a remarkable saving in cost of production; the quality of the flour moreover is decidedly superior, owing to the absence of the compression which accompanies grinding by millstones; and in consequence the bran being scolded off the flour is finer than in grinding, it is more perfectly separated from the flour in the subsequent dressing process. Smaller sizes of the disintegrating machine have been several years in use for pulverising various mineral substances, such as artificial mica, calamine and zinc ore, antimony, and rock asphalt; also for breaking up cattle food, such as oil-cake, &c., and for mixing in sugar factories different shades of molasses, &c., and for mixing the materials for making mortar; and the machines have proved very successful for these purposes. Models were exhibited of the machine, with specimens of a variety of materials pulverised, and samples of the flour produced by the disintegrating mill.

FAULTS.—At a meeting of the Manchester Geological Society, held on Tuesday, in the Museum of Natural History (Mr. John Knowles, President, in the chair), Mr. T. Liveley read a paper "On the Origin of Faults," in which the said faults were generally referred to as "two kinds of 'up-throws' and 'down-throws.'" In his opinion these descriptions were incorrect so far as the former were concerned, there being no such thing as an "up throw" fault being in reality all "down-throws." With regard to the origin of faults, the investigations he had made on the subject led him to the conclusion that they took place when the strata in which they were found were in a state of

transition from a liquid to a solid state. Those faults would undoubtedly greatly modify the chances of working the coal fields lying, as was supposed, under the red sandstone and under the sea. A discussion followed, in which a number of gentlemen took part, some of whom questioned the correctness of Mr. Live-ey's theory as to the origin and direction of faults.

FOREIGN MINING AND METALLURGY.

As the scarcity of combustible is little by little disappearing in France the various establishments which had been in a suffering condition are gradually regaining their old activity. Transactions have been resumed with considerable vigour. At St. Dizier great activity prevails, and in the Nord merchants' iron is maintained at the high rate of 8L 12s. per ton, delivered at La Chapelle, or 8L 4s. per ton at the forges. Plates have advanced to 11L 4s. per ton, and appear likely to be carried to 11L 12s. per ton. A marked improvement is noted in the Meurthe and the Moselle group; and it is remarked with satisfaction that the Eastern of France Railway Company, notwithstanding the losses and difficulties entailed upon it by the war, has made great exertions to meet the requirements of industry. The return of trucks which had been detained in Germany has considerably assisted the efforts made by the company, which, unlike the other great French systems, has not found it necessary to give out this year any orders for additional plant. The curtailment in the network of the company, which has been more than proportioned to the diminution in its stock of plant, has raised the average number of trucks available per mile. The bulletin of the Committee of French Forgemasters shows that the imports of pig and iron experienced a great diminution last year, as compared with 1869, the falling off having been 43 per cent. as regards pig, and 75 per cent. as regards iron and plates. The comparison is made between the first ten months of 1871 and the first ten months of 1869. The exports also decreased. The production of steel in France is shown by official statistics to have very greatly increased of late.

Navigations have been regularly resumed in France on the severe weather of December having broken up, and good deliveries of coal have been made to Paris. Coal traffic on the Northern of France Railway is still, however, carried on only imperfectly. The Northern of France, the Eastern of France, the Western of France, and the Paris, Lyons, and Mediterranean Companies have been authorised to introduce special tariffs for the conveyance of coal and coke. Upon the whole, the condition of the French coal basins may be said to be improving, as coalowners now find it practicable to make deliveries with more rapidity. The principal industrial groups are, indeed, now supplied with coal tolerably regularly. Stocks of coal appear to be small in France, as the production barely keeps pace with the active demand which prevails.

There is nothing very new to report this week in the Belgian iron trade. The aspect of affairs appears to be steadily improving, and prices are tending upwards. The market for rails, which was the last to follow the progressive movement, has regained all the ground which it had lost. The rolling-mills are not accepting any more offers, and a contract for 20,000 tons of rails for Russia, to be delivered in the course of the current year, was not taken up, notwithstanding the favourable conditions upon which it was offered. No establishment showed any desire to enter into engagements, even for a portion of this contract. This is rather a remarkable fact, since Russia is a market which has been greatly sought after by Belgium; and the fact that indifference is now displayed with respect to it is a strong proof that a confident expectation is entertained of a further advance in prices. As the demand for rails appears to be increasing from day to day, it is not unnatural that ironmasters should be reluctant just at present to set themselves fast with heavy contracts, when they consider that there is a good chance of their obtaining more remunerative rates. The apprehensions excited by the strike in the Charleroi basin, a strike which it was feared would curtail supplies of coal, have not been without influence upon the market. These apprehensions have, however, been removed by the rapid and favourable termination of the strike. On all sides, then, the state of affairs appears satisfactory. The Liège gun-making trade is depressed as regards orders for weapons of war, but important orders are reported as regards arms for pleasure and business purposes. Pig is becoming more and more scarce. Prices are firmly maintained for all articles. The Esperance Collieries, Blast-Furnaces, and Rolling-Mills Company commenced the payment on Thursday of a dividend at the rate of 16s. per preference share for 1870-1.

Orders continue to flow in freely at all the Belgian coal-mining centres, and prices are supported with firmness. In the Liège basin there is very great activity; several descriptions of coal are scarce, and coke can scarcely be found at all. Good results are hoped for from the measures taken with regard to the supply of railway plant, but unless proper traffic arrangements can be made with the railway companies of neighbouring countries the difficulties which have at present to be dealt with will be only very partially removed. This remark applies more particularly to the Northern of France and the Eastern of France Companies. The Belgian Chambers have adopted a proposition for a general enquiry into railway management, since they consider that the question very greatly affects the commercial prospects of Belgium. It is complained that not only does railway plant make default in Belgium, but that such rolling-stock as the State Railways already possess is not utilised so well as that of other better directed lines. The North of Charleroi Collieries Company has been paying its 18th share coupon at the rate of 18s. per share; of this dividend 18s. relates to 1870, and 10s. is paid as an interim dividend for 1871.

At Paris, Chilian copper in bars, delivered at Havre, has made 90L per ton; ditto in ingots, 94L; tough English, 96L; and Corocoro minerals, pure standard, 92L per ton. At Havre there has been less business, and not so much firmness in copper, in consequence of the uncertainty existing as to the new taxes which the National Assembly may impose on metals. The sale is mentioned of 30 tons of disposable first marks, Chilian in bars, at 91L 10s. per ton. At Marseilles, Spanish copper has made 86L, and refined Chilian 90L per ton. The German copper markets have exhibited less susceptibility to the causes which have influenced other centres. At Hamburg a reduction in stocks has tended to give increased firmness to the article. At Rotterdam, Russian crown has made 51 fls., and Drontheim 50 fls. to 52 fls. Some improvement is reported in the French tin markets. At Paris, Banca, delivered at Havre or Paris, has made 157L; Straits, delivered at Havre or Paris, 156L; and English, delivered at Havre or Rouen, 156L per ton. At Marseilles, Banca has made 160L; Straits, 158L; and English, 156L per ton. The German markets have not shown much animation, but a further advance is anticipated. At Paris, French lead, delivered at Paris, has made 19L 8s.; Spanish, delivered at Havre, 19L 8s. per ton. At Marseilles lead in saumons, first fusion, has brought 18L 4s. per ton; and second fusion ditto, 17L 16s. per ton. The German lead markets have not shown much variation. The French zinc markets have exhibited favourable tendencies; rolled Vieille Montagne zinc has brought 30L per ton at Marseilles. At Breslau there have been some important transactions.

NEW MINING MAP OF UTAH.—A very valuable map of Utah has just been completed, and published by Mr. B. A. M. Froiseth, of the Surveyor-General's Office, Salt Lake City. The map embraces the general topography of the territory, and shows all the public surveys up to June, 1871. The map is especially valuable now that the enormous mineral resources of Utah are being developed. It has been compiled from all the official documents, and the compiler has added much interesting information (furnished directly to him by some of the oldest travellers and residents of the territory) concerning regions as yet unexplored by the Government. The map shows the boundaries of 28 organised mining districts, as well as the location of several of the principal mines in the best known of them. It is drawn on a scale of 4 miles to the inch, and shows the railroads completed and projected, and the line of the Utah Central, with its branch to the Cottonwood Mine. The minerals already discovered are gold, argenteiferous galena, quicksilver, copper, and manganese, and there is every thing to indicate that this is the adjoining states and territories will add to the material wealth of the United States, and attract mining capitalists from all countries. To these reliable maps are indispensable, necessary, and if they can at all times succeed in obtaining them as good as those now under consideration they may be well satisfied.

AUSTRALIAN HANDBOOK AND ALMANACK.—The third annual edition of this almanack, for 1872, has just been issued by Messrs. Gordon and Gotch, of Holborn Hill, and Melbourne and Sydney. It contains a large amount of matter, of considerable value both to the colonists themselves and to residents in England interested in colonial matters. The volume affords excellent descriptions, historical and general, of New South Wales, Victoria, South Australia, Queensland, West Australia, Tasmania, and New Zealand, as well as a gazetteer of the principal towns in the several colonies. The account of the

kingdom of Fiji is very interesting, and the list of importers will prove of considerable value to those desirous of doing business with the colony, and the same may be said of the carefully-arranged colonial customs tariffs which the book contains.

BONN'S SYSTEM OF WEIGHTS AND MEASURES.—A pamphlet published by Prof. W. Bonn, a teacher of English in Paris, is noticed in the last number of *La Houille*. It is entitled "Great Britain's New Proposed Decimal Albert System of Weights, Measures, and Coins." Mr. Bonn would make 4 ft. English the unit of measure, a 4s. piece the unit of mohay, and a 3-pint measure the unit of capacity—thus there would be all the inconvenience of changing our present system, and not one single advantage of the metric system.

FOREIGN MINES.

ST. JOHN DEL REY.—The directors have received the following report, dated Morro Velho, Jan. 1:—Morro Velho produce for the second division of December, 11 days, 4299 oits.; yd. 1d, 2,359 oits., per ton. Gala produce, for the second division of December, 11 days, 134 oits.; yield, 1,029 oits., per ton.—New Shafts: An additional series of pumps was put to work on Dec. 26, and the water lowered since about 18 in. daily. In the old mines it was lowered during the month over 35 feet.

PEDRO NORTH DEL REY.—Extract from letter dated Dec. 29: Though holiday season, the attendance of force is satisfactory, and the works generally are progressing. In the mine there is further improvement to note.

As anticipated in my last, the line of gold in Canhas has undergone a favourable change; it is more settled, and again yielding box work, though not rich.

No. 3 also presents an improved appearance. This line has lately been embraced in the general stoping, but yesterday work for boxes was again extracted therefrom. The captains say:—"A good box work sample was obtained on the 27th inst. from a small line discovered in the footwall of the lode in the 25, driving east on No. 6 shoot. Although we cannot prosecute operations on this until deeper drainage is effected, it augurs well for the future working of the mine in depth." No other section calls for special comment. At Mati das Cobras samples to date have not proved auriferous, but some lines of good looking jacotinga have been met with. Hitherto nothing but clay had been encountered. For surface operations the weather is favourable. In connection with the pumping machinery, all the work continues to progress satisfactorily, excepting timber, which is backward for reasons as given in my previous letter.

In the masonry at the wheel-pit the show made weekly is small, owing to the heavy nature of the work. The ground in some places is still troublesome, and in addition to this the quarrying, preparation, and conveyance of stone and other materials cannot be carried on as quickly as could be desired.

This work is one of great magnitude, and its execution in this country requires time and patience.

But with the large wire-rope just sent out, and new wooden pumps,

now in course of being made, it is the belief of the captains that the present wheel will enable sinking to be prosecuted for another 10 fms.

Everything done, and what still remains to be done, will be set forth in the annual reports shortly to go forward. Produce to date amounts to 6761 oitavas, and it is estimated that for the month the total will be about 9500 oitavas.

ANGLO-BRAZILIAN.—Extract from letter dated Dec. 31: *Passagem*:

General Remarks: The works have progressed favourably; stamps kept in good order, and working well—*Mine*: At Dawson's, south, the lode still retains its fair appearance. At Dawson's shaft, 44 fm. level, &c., the crushed arches are very extensive, the lode averaging from 8 to 12 ft. in thickness, well interspersed with pyrites; supply of tone adequate to our present hauling powers.—*Pitangui*: General Remarks: Communications from this place advise the arrival at bottom of Francisco Antonio's incline, but no accurate opinion can as yet be formed of its value. The water is very quick and troublesome; it is almost impossible to keep it with our present means for pumping. Some samples taken under water, and the result not very disengaging. Hoskin's level continues nearly the same as last reported on. Our progress is slow, as the ground is hard. As yet no increase of water, or signs of jacotinga. The total length of this level is 52 fathoms.—*Surface Work*: While in a fair way of progress. Water-wheel and stamp under repair; every man available employed about it.

GENERAL BRAZILIAN.—Dec. 28: *St. Anna*: At the shallow adit

No. 1 an improvement has taken place; the ground is now more favourable for driving.

At the old adit a cross-cut has been driven from No. 2 to small shaft No. 1, and sinking the latter recommended, the water being drawn at the former with Californian pump. No shoot or vein has yet been met with.—*Itabira*: At the shallow adit little or no alteration has taken place since last advised. Moore's shaft being under suspension on account of water. The middle adit has been resumed. At present the men are employed in repairing and adjusting broken sets of timber where we pass the flookey, at which placed the ground is very heavy. At Souza's the vein at cross-cut No. 1 continues disordered. At cross-cut No. 2 the vein has been discovered; it is not rich, but affords good work for the stamping-mill.—*Surface*: The stamping-mill at Itabira is far advanced, and every effort will be made to set it to work this year. We have done temporary repairs to another old mill, in order to treat as much debris as possible during the wet season; but up to the present date, although many heavy showers have fallen, we are still without the continued rains usually prevalent over this. The old mill just mentioned will be called old stamping-mill No. 2, and the one previously repaired the old stamping-mill No. 2. Since last advised 6 tons from Souza's vein have been stamped, and produced 37 oits. of gold; yield, 6166 oits. per ton. The debris treated at Foster's stamp has not been cleared up, but will be at the end of the month.

ROSSA GRANDE.—Dec. 28: *Bahia*: The lode in the sump-shaft is a

little more contracted than when last reported on, being now about 2 ft. wide, producing very auriferous quartz, 32 tons of which have been crushed. The sand produced from the same is now being cleaned up, and the yield of gold obtained shall be communicated by the next English packet. The 10 east is in unbroken ground; lode 1½ ft. wide. Since my last report a level has been commenced westward, 10 fms. 2 ft. below adit, called the 10 west. The main lode here is all excavated, but I have reason to hope that the footwall branch will more than pay for driving the same.—*Cachoeira*: Good progress is still being made in sinking Richard's shaft, which is now within 2 fms. of the adit level. The lode above adit, as far as we have been able to examine, is all excavated. The lode in the adit level end is without change worthy of notice.

EXCHEQUER (Gold and Silver).—Lewis Chalmers, Jan. 6: On the 11th ult. I reported for the previous week 18 feet driven in the upper tunnel, and 10% feet in the Accacia. On Sunday I found fault with the Accacias; on Monday they all left. That day the storm commenced—a storm which has not visited this country since 1867. I have not, therefore, been able yet to put fresh hands in this tunnel, which I regret, as it ought to be pushed with all dispatch so as to reach yet another source of ore by spring. During the week ended Dec. 23, the upper tunnel was driven 18½ feet, 350 west of north, and five sets of timbers were placed. This Christmas holidays commenced on the 25th, and the men having gone to spend them at Silver Mountain were prevented by the increasing storm from regaining the mine until Thursday last (4th inst.), so that they only worked two days this week, during which they ran 1 foot of main tunnel, and 60 feet of tunnel from the dwelling-house to the mine through the snow, 20 feet deep in places. One of the men in returning was buried in a snow-slide, but rescued by his companions. Now, however, that the men are back to the mine, and the connection between the dwelling-house and mine secured: there will be no further interruption of the work there.

Provisions and supplies are all laid in.

IMPERIAL OTTOMAN.—Telegram: Pera, Jan. 30: Pilidliore shipped yesterday. Bills by post. (Signed) HARVEY.

YUBA.—Mr. Mattingley writes, under date Dec. 15, that yesterday

the mill commenced to work again (though not so soon as he had expected by

several weeks), and to-day they started the pans and settlers to work. It all

works well, splendidly, in all its departments, far better than ever before. The

severity of the weather for the past four or five weeks has much retarded the

progress of the work, or they would have been started earlier. However, at this

time it is more mild and favourable, and he hopes to be able to run constantly

for the future. Has not been taking out much ore from the Stanley for past

two weeks, but have been driving the main tunnel or drift further east on the

lode, and pleased to say that to-day they have struck into a larger and better

body of ore than heretofore encountered. Capt. Hufaker, the foreman in

the mine, is of the opinion that the prospects and indications of a very large

and rich body of ore are more favourable than ever before seen in the mine.

The ledge has been much broken up and somewhat faulty, and presented a con-

fusion mass at the point they commenced to work, but is now becoming more

solid, compact, and regular in all its features.

PACIFIC.—Telegram, Jan. 30: Production past week, \$4000.

COLORADO TERRIBLE LODE.—The board has received the (late)

agents report for November. The yield of ore during the month was 12 tons,

2,000, and 180 tons of the 1st, 2nd, and 3rd class ores respectively, worth

\$2,700, against costs and charges of \$6000. Quantity and value of ore on hand

on Nov. 30, including that in course of sale, transit, and at the mine:—

45 tons of 1st class ore, valued at 10% per ton £4,500

408 " 2nd " 16d. " 6,528

214 " 3rd " 20d. " 1,576

Total 12,604

From which is deducted, to cover expenses to Nov. 30 6,404

Add 10 tons 1st class ore sold, 90L 3s. 8d. per ton 6,200

Add dividend of 2s. per share already paid 2,100

Exhibits the apparent profits of the company for 8 months

to Nov. 30 last £9,290

New agent, Mr. George Teal, took over charge of the mine on Dec. 1. His

latest advice is to Jan. 3. The country had been visited by unusually early

and continuous snow storms, causing nearly all out-door operations to be re-

stricted, and the hauling of ore more expensive. However, these difficulties

will soon be overcome, for, by telegram, dated Jan. 26, the directors

have received advice of the dispatch of four shipments of 1st class ore, valued about 4000L. One of these shipments reached Liverpool, per s.s. Russia, on Jan.

29. The advice of Mr. Teal and Mr. Clark state that the interior of the mine

continues to be in every respect most satisfactory.

ECLIPSE.—Mr. Henry Tregellas reports under date Jan. 2, the

yield of gold from the stamps for the second division of December, is 21,559.

This has been derived from 250 tons of the quartz that lay at the mine at the big

heap. He anticipated a better yield, and they would have had, had they been

able to treat more fully the tailings and concentrated sand. From one grinding

pan they obtained, in twelve days, \$400. They are filling up the remainder

of the pans (4), when they will get better results. They have on hand near

100 tons of concentrated tailings, which assay over 230 per ton. When they

get the five pans running, there will be no accumulation of tailings. Opera-

tions at the mine since last report have been confined to sinking Haymen's

shaft, which is now down 46 feet below the 300 feet level. The lode is 7 ft. wide,

but during the sinking of the last 10 feet the lode has been poor. It must be

borne in mind that Haymen's shaft is sunk by a side of a cross-course over

20 feet wide, consequently the lode in said shaft has often been disordered by

the influence of the cross-course, which is the case with the lode in Haymen's

shaft at this time; but from appearances, he believes they will soon get a change

for the better. Since last report they have opened the track as far as completed

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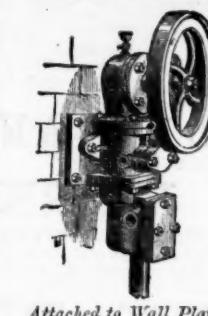
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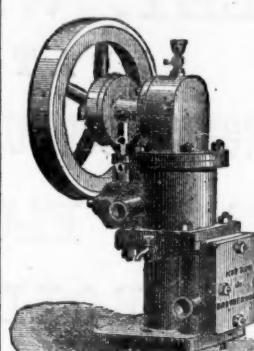
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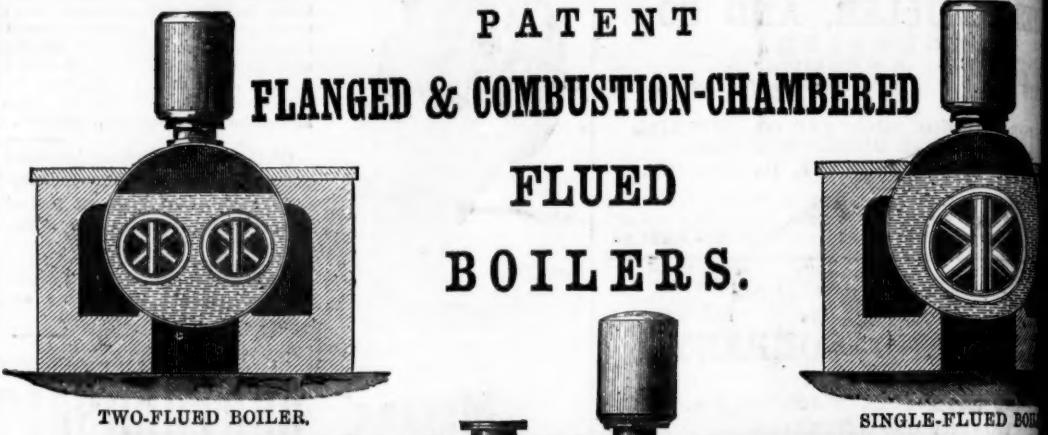
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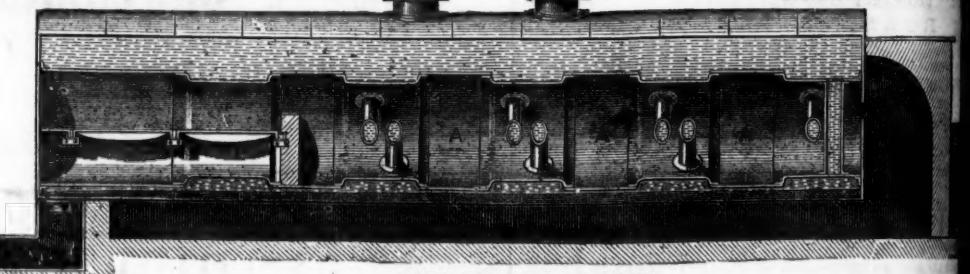
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